

Claims

1. An anode stream recirculation system for a fuel cell, the fuel cell including an anode gas input and an anode gas output, the anode stream recirculation system comprising:

5           an anode gas supply;

              a switch connected with the anode gas supply;

              a pressure regulating device connected between the switch and the anode gas input of the fuel cell;

10           a diaphragm pump connected between the anode gas output and the anode gas input of the fuel cell thereby forming an anode gas recirculation; wherein the diaphragm pump has at least a sensor electrically connected with the switch.

2. The anode stream recirculation system for a fuel cell according to Claim 1, wherein the anode gas is hydrogen.

15 3. The anode stream recirculation system for a fuel cell according to Claim 1, wherein the switch is an electromagnetic valve.

20 4. The anode stream recirculation system for a fuel cell according to Claim 1, wherein the diaphragm pump has a wall defining an interior space, a piston provided in the interior space, and a diaphragm assembly sealing with the piston and the wall of the diaphragm pump thereby dividing the interior space into two portions.

25 5. The anode stream recirculation system for a fuel cell according to Claim 4, wherein the diaphragm pump comprises two Hall effect sensors with one disposed at an upper side and the other disposed at a lower side of the diaphragm pump, and a magnetic member disposed on the piston to interact with the Hall effect sensors.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

6. The anode stream recirculation system for a fuel cell according to Claim 5, further comprising an elastic device resisting against a bottom of the piston to provide an upward force to the piston.
7. The anode stream recirculation system for a fuel cell according to Claim 6, wherein the piston is adapted to move between a first position and a second position depending on variation of pressure on two sides of the diaphragm assembly and the force provided by the elastic device; the two sensors are used to sense the piston by detecting the magnetic member, when the piston moves to the first position, one of the sensor transmits a signal to switch off the switch, when the piston moves to the second position, the other sensor transmits another signal to switch on the switch.
8. The anode stream recirculation system for a fuel cell according to Claim 4, wherein the diaphragm pump further comprises an opening such that a portion of the interior space of the diaphragm pump is communicated with atmosphere.
9. The anode stream recirculation system for a fuel cell according to Claim 1, further comprising two check valves with one provided between the anode gas input of the fuel cell and the diaphragm pump, and the other provided between the anode gas output of the fuel cell and the diaphragm pump.
10. The anode stream recirculation system for a fuel cell according to Claim 4, wherein the diaphragm pump further comprises a water inlet and a water outlet, thereby a portion of the interior space of the diaphragm pump is filled with water by communicating with a water circulation system.
11. A diaphragm pump for a fuel cell, the diaphragm pump is used in an anode stream recirculation system for the fuel cell, the diaphragm pump comprising a wall defining an interior space, a piston provided

2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

in the interior space, and a diaphragm assembly sealing with the piston and the wall of the diaphragm pump thereby dividing the interior space into two portions.

12. The diaphragm pump according to Claim 11, further comprising an elastic device resisting against a bottom of the piston to provide an upward force to the piston; the piston is adapted to move between a first position and a second position depending on variation of pressure on two sides of the diaphragm assembly and the force provided by the elastic device.

10 13. The diaphragm pump according to Claim 11, further comprising at least one sensor to sense the piston.

14. The diaphragm pump according to Claim 13, wherein the diaphragm pump comprises two Hall effect sensors with one disposed at an upper side and the other disposed at a lower side of the diaphragm pump, and a magnetic member disposed on the piston to interact with the Hall effect sensors.

15. The diaphragm pump according to Claim 11, wherein the diaphragm assembly comprises a diaphragm made of rubber.